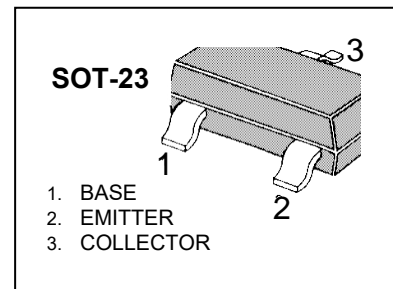


BFR93A Low Noise Silicon Bipolar RF Transistor

FEATURES

- High Gain-Bandwidth Products
 $f_T=6$ GHz (Typ) @ 30 mA
- Low Noise Figure
 $N_F=1.6$ dB (Typ) @ 800 MHz
- High Gain
 $G_{PS}=14.0$ dB (Typ) @ 800 MHz



Marking R2s

ABSOLUTE MAXIMUM RATINGS ($T_A = 25\text{ }^\circ\text{C}$)

Rating	Symbol	Value	Unit
Collector – Emitter Voltage	V_{CEO}	12	V
Collector – Base Voltage	V_{CBO}	20	V
Emitter – Base Voltage	V_{EBO}	2	V
Collector Current	I_C	50	mA
Power Dissipation	P_{tot}	300	mW
Junction Temperature	T_{JMAX}	150	$^\circ\text{C}$
Operating Junction Temperature Range	T_J	-45 to +150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-65 to +150	$^\circ\text{C}$

THERMAL CHARACTERISTIC

Thermal Resistance, Junction to Case	$R_{\theta JC}$	450	$^\circ\text{C/W}$
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ELECTRICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
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DC CHARACTERISTICS

Collector – Base Cutoff Current, $I_E=0\text{ mA}, V_{CB}=10\text{ V}$	I_{CBO}	–	–	100	nA
Emitter – Base Cutoff Current, $I_C=0\text{ mA}, V_{EB}=2\text{ V}$	I_{EBO}	–	–	10.0	μA
Collector – Emitter Breakdown Voltage, $I_C=1\text{ mA}, I_B=0\text{ mA}$	$V_{(BR)CEO}$	12	–	–	V
Collector – Emitter Saturation Voltage, $I_C=50\text{ mA}, I_B=5\text{ mA}$	$V_{CE(sat)}$	–	100	400	mV
DC Current Gain, $I_E=30\text{ mA}, V_{CB}=5\text{ V}$	h_{FE}	40	90	150	–

AC CHARACTERISTICS

Transition Frequency, $I_C=30\text{ mA}, V_{CB}=5\text{ V}, f=300\text{ MHz}$	f_T	4.6	6.0	–	GHz
Collector-Base Capacitance, $I_E=0\text{ mA}, V_{CB}=10\text{ V}, f=1\text{ MHz}$	C_{cb}	–	0.45	0.9	pF
Noise Figure, $I_E=5\text{ mA}, V_{CE}=8\text{ V}, f=800\text{ MHz}, Z_S=50\Omega$	N_F	–	1.6	–	dB
Power Gain, $I_E=30\text{ mA}, V_{CE}=8\text{ V}, f=800\text{ MHz}, Z_S=50\Omega, Z_L=Z_{Lopt}$	G_{PS}	12.5	14.0	–	dB

Typical Characteristics

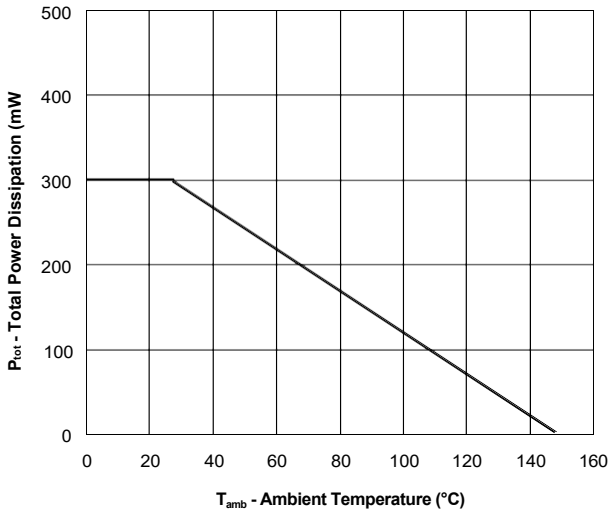


Figure 1. Total Power Dissipation vs. Ambient Temperature

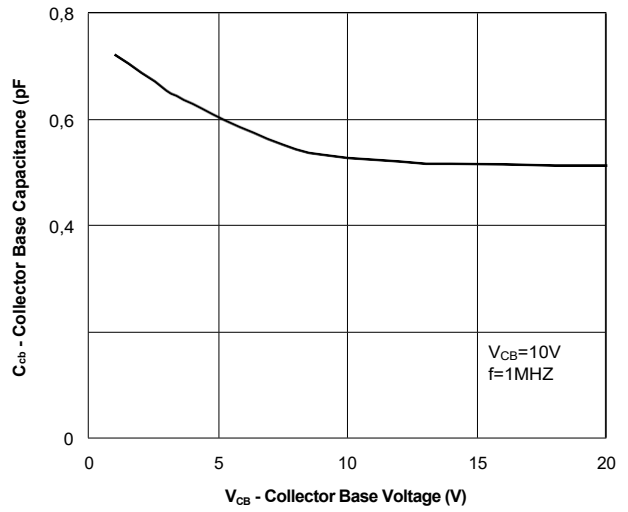


Figure 2. Collector – Base Capacitance vs. Collector – Base Voltage

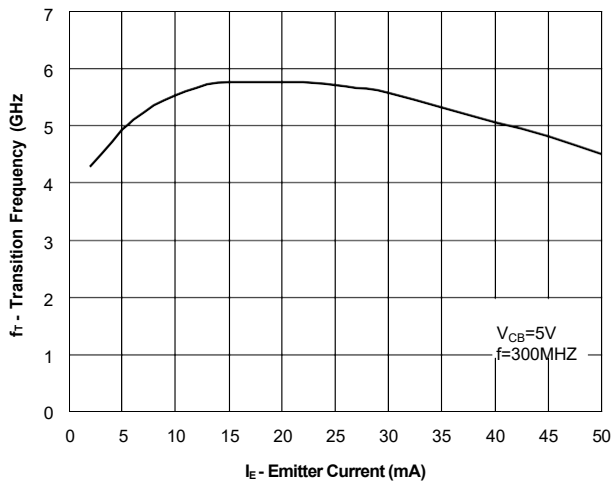


Figure 3. Transition Frequency vs. Emitter Current

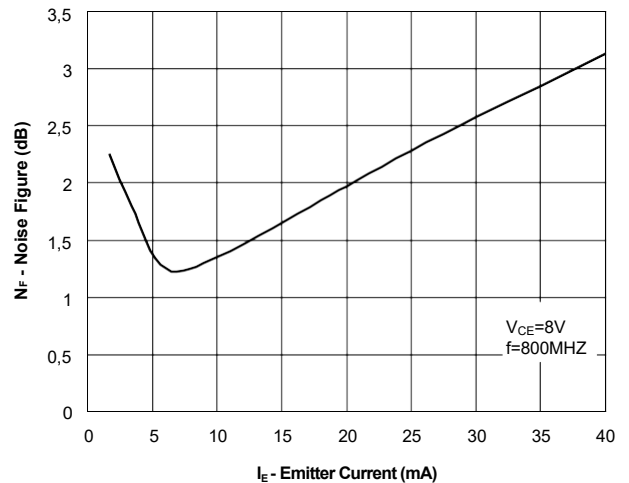


Figure 4. Noise Figure vs. Emitter Current

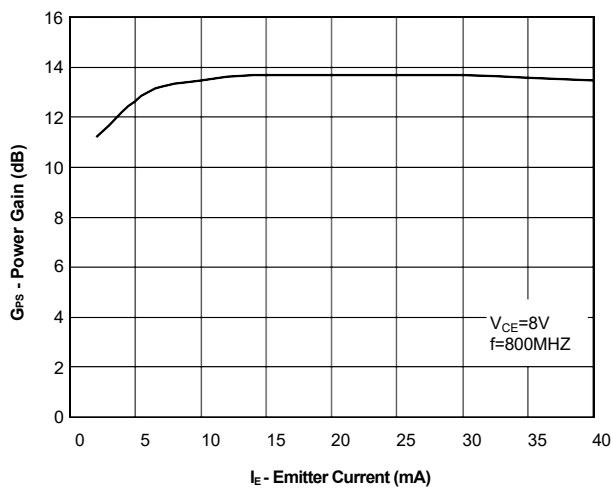


Figure 5. Power Gain vs. Emitter Current

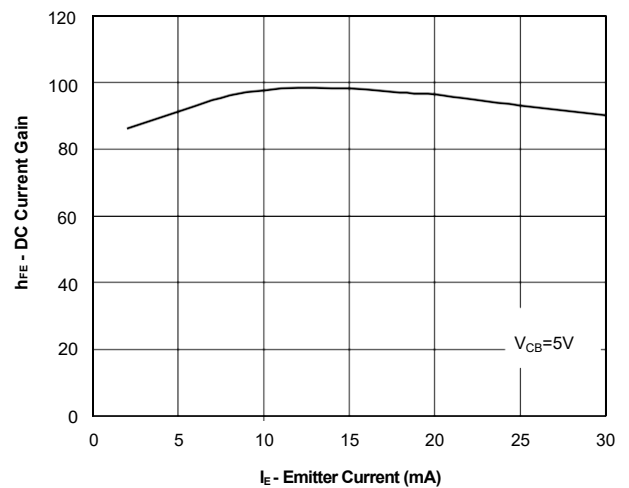
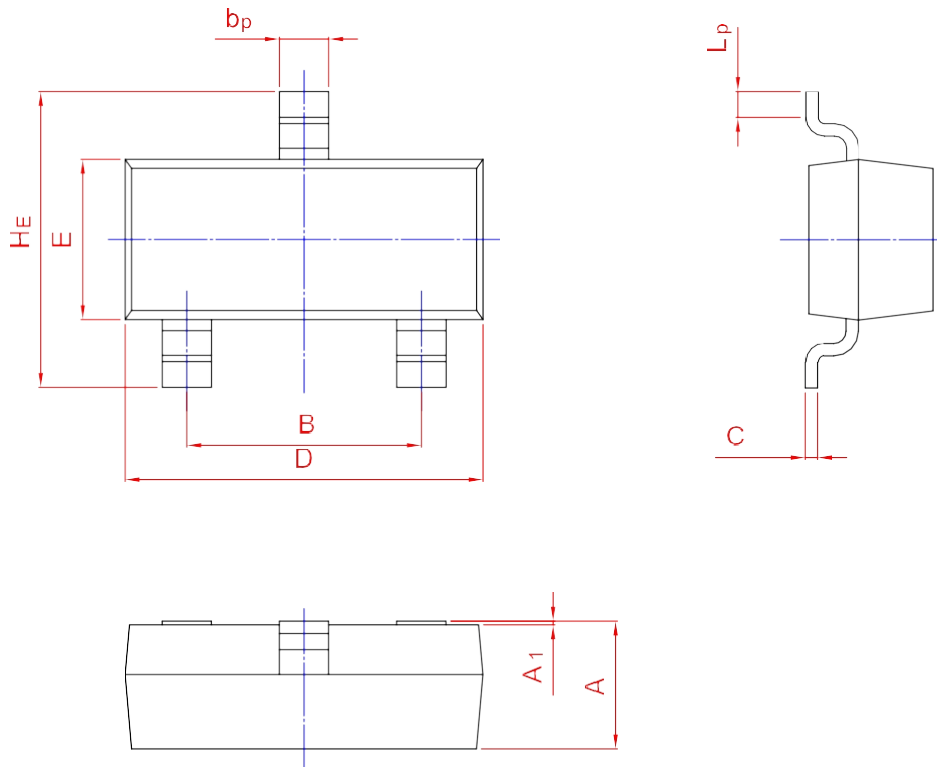
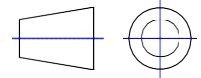


Figure 6. DC Current Gain vs. Emitter Current

PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT-23



UNIT	A	B	b _p	C	D	E	H _E	A ₁	L _p
mm	1.40	2.04	0.50	0.19	3.10	1.65	3.00	0.100	0.50
	0.95	1.78	0.35	0.08	2.70	1.20	2.20	0.013	0.20